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Application of: DeVries, Hindrik Willem et al.

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AMENDMENTS TO THE CLAIMS

1. (Currently amended) A method Method for generating an atmospheric pressure glow discharge plasma (APG), wherein a plurality of electrodes are arranged defining a discharge space for forming said plasma, wherein said electrodes are connected to a power supply and an AC-voltage is applied to said electrodes, and wherein a gaseous substance is provided in said discharge space, wherein said AC-voltage applied to said electrodes has an amplitude equal to at least the breakdown voltage of said gaseous substance and has a frequency of at least 50 kHz, and said gaseous substance essentially comprises at least one of a group comprising argon, nitrogen and air.

2. (Currently amended) The method Method according to claim 1, wherein said AC-voltage amplitude is less than or equal to approximately 140% of said breakdown voltage.

3. (Currently amended) The method Method according to claim 2, wherein said AC-voltage amplitude is between 110% and 120% of said breakdown voltage.

4. (Currently amended) The method Method according to ~~any of the previous claims~~ claim 1, wherein the temperature of said gaseous substance is lower than 100 C.

5. (Currently amended) The method Method according to ~~any of the previous claims~~ claim 1, wherein at least one further gas is provided to said gaseous substance in said discharge space.

6. (Currently amended) The method Method according to claim 5, comprising at least the steps of: providing said further gas to said discharge space after essentially stabilising said plasma such that the concentration of said further gas is fractionally increased stepwise; and stabilizing said plasma by adjusting said AC-voltage after each stepwise increment of said concentration of said further gas.

7. (Currently amended) The method Method according to ~~any of the claims 5 and 6~~ claim 1, wherein said at least one further gas is provided to said gaseous substance in a concentration of at most 50% by volume.

8. (Currently amended) The method Method according to claim 7, wherein said concentration is at most 20% by volume.

9. (Currently amended) The method Method according to ~~any of the claims 5-8~~ claim 5, wherein said at least one further gas provided to said gaseous substance in said discharge space is comprised of at least one of a group of O₂, CO₂, NH₃, common precursor gasses such as SiH₄, hydrocarbons, organosilicons such as TEOS and HMDSO, or organometallics and combinations thereof.

10. (Currently amended) The method Method according to ~~any of the previous claims~~ claim 9, wherein said gaseous substance provided in said discharge space is flowed through said discharge space, establishing a gas flow.

11. (Currently amended) The method Method according to claim 10, wherein said gas flow has a flow rate in a range of 1 l/min to 50 l/min.

12. (Currently amended) The method Method according to ~~any of the claims 10 and 11~~ claim 10, wherein the velocity of the gas flow is in the range of 0.1-10 m/s.

13. (Currently amended) The method Method according to claim 12, wherein the velocity of the gas flow is in the range of 1-5 m/s.

14. (Currently amended) The method Method according to ~~any of the previous claims~~ claim 1, wherein said AC-voltage is chosen to comprise a frequency less than 1 MHz.

15. (Currently amended) The method Method according to claim 14, wherein said frequency of the AC-voltage is chosen within a range of 100 kHz to 700 kHz.

16. (Currently amended) The method Method according to ~~any of the previous claims used for treating a polymer film~~ claim 1, wherein a residence time of said for treating a thermoplastic polymer film in said discharge space is chosen such that said thermoplastic polymer film is kept at a temperature below said glass transition temperature of said a thermoplastic polymer film.

17. (Currently amended) The method Method according to claim 16, wherein said residence time is controlled by moving said film through said thermoplastic polymer discharge space and while controlling the velocity of said thermoplastic polymer film.

18. (Currently amended) The method Method according to ~~any of the previous claims used for treating a polymer film~~ claim 16, wherein the amplitude of said AC-voltage is chosen such that the temperature of the discharge space remains below a glass transition temperature of said thermoplastic polymer film during treatment of said thermoplastic polymer film and for maintaining said glow plasma.

19. (Currently amended) The method Method according to ~~any of the claims 16-18~~ claim 16, wherein said thermoplastic polymer film comprises at least one of a group comprising triacetyl cellulose(TAC), polyethyleneterephthalate (PET), polyethylene-naphthalate (PEN) and similar thermoplastic polymers.

20. (Currently amended) The method Method according to ~~any of the previous claims~~ claim 1 wherein at least one of said electrodes is covered with a film of dielectric material.

21. (Currently amended) The method Method according to claim 20, wherein said film of dielectric material is chosen comprising a thickness in a range of 1 μm to 1000 μm .

22. (Currently amended) The method Method according to claim 21, wherein said thickness lies within a range of 250 μm to 500 μm .

23. (Currently amended) The method Method according to ~~any of the previous claims~~ claim 1, wherein at least two of said electrodes are spaced apart from each other over a distance within a range of 100 µm to 5000 µm.

24. (Currently amended) The method Method according to claim 23, wherein said distance is chosen within a range of 250 µm to 1500 µm.

25. (Currently amended) The method Method according to ~~any of the previous claims~~ claim 1, wherein a voltage rise time defines a shortest time interval for said AC-voltage to reach its maximum value starting from zero, and wherein said voltage rise time of the AC-voltage is in the range of 0.1 to 10 kV/µs.

26. (Currently amended) The method Method according to ~~any of the previous claims~~ claim 1, wherein current density through said plasma is less than 10 mA/cm².

27. (Currently amended) The method Method according to ~~any of the previous claims~~ claim 1, used for treating a substrate in said discharge space with a chemical vapour deposition process using said plasma.

28. (Currently amended) An arrangement Arrangement for generating an atmospheric pressure glow discharge plasma (APG), comprising a plurality of electrodes arranged such that a discharge space is defined by said electrodes, further comprising means for applying an AC-voltage to said electrodes, and means for providing a gaseous substance to said discharge space, wherein said means for applying an AC-voltage to said electrodes are arranged for applying an AC-voltage having an amplitude equal to at least a breakdown voltage of said gaseous substance and having a frequency of at least 50 kHz, and said means for providing a gaseous substance to said discharge space are arranged for essentially providing at least one of a group comprising argon, nitrogen and air having a temperature lower than 100°C.

29. (Currently amended) The arrangement Arrangement according to claim 28, wherein said means for applying an AC-voltage are arranged for providing an AC-voltage having amplitude up to 140% of said breakdown voltage.

30. (Currently amended) The arrangement Arrangement according to ~~any of the claims~~ claim 28 or 39, wherein said means for providing a gaseous substance are arranged for providing at least one further gas to said gaseous substance in said discharge space.

31. (Currently amended) The arrangement Arrangement according to claim 30, wherein said means for providing a gaseous substance are further arranged for providing at least one further gas such that the concentration of said at least one further gas is stepwise adjustable.

32. (Currently amended) The arrangement Arrangement according to ~~any of the claims~~ claim 30 or 31, wherein said at least one further gas comprises one of a group of

0₂,CO₂,NH₃, common precursor gasses such as SiH₄, hydrocarbons, organosilicons such as TEOS and HMDSO, or organo-metallics, and combinations thereof.

33. (Currently amended) The arrangement Arrangement according to any of the claims claim 28-34, comprising means for flowing said gaseous substance through said discharge space.

34. (Currently amended) The arrangement Arrangement according to claim 32, wherein said means for flowing said gaseous substance through said discharge space is arranged for establishing a flow with a flow rate within a range of 1l/min to 50 l/min.

35. (Currently amended) The arrangement Arrangement according to claim 34, wherein said means for flowing said gaseous substance through said discharge space is arranged for establishing a flow with a flow velocity within a range of 0.1-10 m/s.

36. (Currently amended) The arrangement Arrangement according to any of the claims claim 28-35, wherein said means for applying a high frequency AC-voltage is arranged for applying a voltage comprising a frequency within a range of 50 kHz to 1 MHz.

37. (Currently amended) The arrangement Arrangement according to any of the claims claim 28-36, wherein at least one of said electrodes is arranged for supporting a thermoplastic polymer film to be treated by said plasma.

38. (Currently amended) The arrangement Arrangement according to any of the claims claim 37, further comprising means arranged for moving said thermoplastic polymer film through said discharge space with a velocity for which the residence time of said thermoplastic polymer film is such that the thermoplastic polymer film is kept at a temperature below said a glass transition temperature of said thermoplastic polymer film.

39. (Currently amended) The arrangement Arrangement according to any of the claims claim 37 or 38, wherein said means for applying an AC-voltage are arranged for providing an AC-voltage having an amplitude such that the temperature of the discharge space remains below a glass transition temperature of said thermoplastic polymer film during treatment of said thermoplastic polymer film.

40. (Currently amended) The arrangement Arrangement according to any of the claims claim 28-39, comprising including a film of dielectric material that is contiguous to at least one of said electrodes.

41. (Currently amended) The arrangement Arrangement according to claim 40, wherein said film of dielectric material comprises a thickness in a range of 1μm to 1000 μm.

42. (Currently amended) The arrangement Arrangement according to any of the claims claim 28-41, wherein said discharge space comprises dimensions defined by a spacing distance between said electrodes and said dimensions are within a range of 0.1 mm to 5 mm.

43. (Currently amended) The arrangement Arrangement according to any of the claims claim 28-42, wherein arranged for adjusting the shortest time interval for said AC-voltage to reach its maximum value starting from zero, and wherein said adjusting can be is performed at least in a range of 0.1 to 10 kV/μs.

44. (Currently amended) The arrangement Arrangement according to any of the claims claim 28-43, arranged for adjusting wherein the current density through said plasma is adjustable in a range below 10 mA/cm².

45. (Currently amended) The arrangement Arrangement according to any of the claims claim 28-44, comprising further including a current choke coil arranged for stabilising said plasma.

46. (Currently amended) The arrangement Arrangement according to any of the previous claims claim 28, said arrangement being arranged for performing wherein a chemical vapour deposition treatment process is performed on a substrate in said discharge space using said plasma.

47. (New) The method according to claim 7, wherein said at least one further gas provided to said gaseous substance in said discharge space is comprised of at least one of a group of O₂, C0₂, NH₃, common precursor gasses such as SiH₄, hydrocarbons, organosilicons such as TEOS and HMDSO, or organo-metallics and combinations thereof.

48. (New) The arrangement according claim 30, wherein said at least one further gas comprises one of a group of O₂, CO₂, NH₃, common precursor gasses such as SiH₄, hydrocarbons, organosilicons such as TEOS and HMDSO, or organo-metallics, and combinations thereof.